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WEB PAPER

Writing for academia: Getting your research into print: AMEE Guide No. 74

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Abstract

The authors identify and describe strategies for success in writing for publication, including how to choose an educational research topic, define the question and choose the correct design, know the anatomy of a research paper, write each of the sections, optimize the writing before publication, choose a journal, and respond to editors and reviewers. The research question should be focused, modest, and achievable given the constraints of the setting, significant, and appropriately imbedded in the available literature. The choice of methods is determined by the nature of the educational research question and should conform to ethical standards. Specific strategies for writing include starting where it is easiest to do so, spontaneously and uncritically writing the first paragraphs through, minimizing external impediments to the work, and knowing how each section of a manuscript is routinely structured. All papers require a number of revisions with careful attention to accuracy and detail as well as to specific requirements of the target journal before submission. Authors should respond positively, not defensively, and in detail to all of the editor's and reviewers' suggestions for revision. Writing for success is therefore a disciplined and systematic process following prescribed steps, which, although hard work, is rewarding.

Introduction

Medical educational research is optimally a systematic inquiry intended to extend knowledge or to solve a research question of interest in the educational preparation of medical students, residents, specialty and subspecialty fellows, biomedical scientists, allied health trainees, and practicing clinicians. This field of scholarship serves the critically important functions of enriching educational theory and practice by substantiating "best evidence medical education" (Harden et al. 2000; Hart & Harden 2000) and, ultimately, it is hoped that this work will benefit patients.

Medical education research is undergoing enormous expansion, and wide-ranging opportunities are available for contributing to this growth. This AMEE Guide is intended to promote medical education research by helping researchers at all levels of experience to be successful in preparing and publishing an educational research project. This Guide is the third in a medical education series on general research topics and follows papers on a general introduction to research (Ringsted et al. 2011) and on writing an educational research and grant proposal (McGaghie 2009).

Our goals for this Guide are to identify and describe strategies for success in writing for publication. These strategies include choosing an educational research topic, defining the question and choosing the research design, knowing the "anatomy" of a research paper and how to write each of the sections, and optimizing the writing before submission to a journal. We will also talk about the factors to consider in the choice of a journal in which to publish and how to respond to any comments by editors and reviewers. Our focus is on educational research, not other forms of writing such as reviews, annotated bibliographies, and commentaries. We want readers to get started and to succeed in their quest to become productive educational researchers and writers.

Practice points

- Writing for success is a systematic, disciplined process.
- The research question should be focused, imbedded in the available literature, and achievable given the available resources.
- The research design is determined by the question, should conform to ethical educational standards, and should be comprehensively described.
- Strategies for writing include starting where it is easiest to do so, spontaneously and uncritically writing the first paragraphs, and identifying and reducing specific barriers to writing.
- Getting the final submission ready requires very careful attention to detail and accuracy.

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Choosing a topic and getting started

Prospective researchers will appreciate that medical education research grows by accretion or by small gains. Researchers should not think that they have to do a landmark study or a major study, because such an ambition is daunting and can detract from the pleasure of the work. In order to get started, the research goal should be feasible and achievable given resources, including the availability of time, potential participants, finances, and administrative assistance. It should also be appreciated that any question worth answering is worth examining for program evaluation purposes and may be worth publishing. This means that researchers should not let down themselves, their topics of inquiry, their study volunteers, or their potential prospective readership by a lack of rigor or attention to the methodology. Thus, the research question should be focused to allow for an achievable and well-supported answer given the constraints of the setting where the research is to take place (Table 1).

Educational questions can arise from everyday experiences and ideas, whether from clinical rounds or clinical team discussions, *ad hoc* conversations with colleagues, reading educational texts or articles, educational conferences, or any educational teaching or learning experience. As Ringsted et al. (2011) noted, the challenge is to place a concrete idea, interest, or problem within a general context of learning, teaching, and education. Educational research thus is not just about answering local questions but general questions about learning, teaching, and education that are studied in local contexts (Ringsted et al. 2011).

Importance of the question

In choosing a question, the researcher should ask what its significance is. Is the question to be answered relevant to many people or, perhaps, relevant to fewer people but very influential or problematic? Reviewers and editors will view this consideration as crucial in the judgment of the suitability of a manuscript for publication (Roberts et al. 2004). Significance pertains to the prevalence and/or seriousness of an issue and the likelihood that the results will benefit educators and their learners. Significance is also understood by how the study's results might add to the available literature, whether there are few studies on a topic that is timely, whether the study allows for a reassessment of the confidence attributable to the findings of more well-studied topics, or whether the study improves on earlier methodologies (Coverdale et al. 2005). The potential generalizability of study results is also a prime consideration in assigning importance to a question for potential study (Coverdale et al. 2005; Ringsted et al. 2011).

Table 1. Choosing a topic.

Choose a topic with a question that is doable
Choose a topic area for which you have enthusiasm
Identify the importance or significance of the topic
Imbed the topic and question in the related literature
Look for mentorship and constructive criticism on the research idea
Choose capable, enthusiastic, and compatible team members

Embeddedness in the literature

The researcher therefore should carefully appraise the literature on the topic area in order to establish what, if anything, has been written on the topic before. Previous studies on the topic should be appraised for their methodological strengths and weaknesses so that the methodology and context of the currently proposed study is understood. This appraisal will enable a preliminary assessment of how rigorous the study needs to be in order to contribute to that literature. Earlier methodological deficiencies should be identified and addressed, when possible, in the proposed study design. These are critical steps in the decision whether or not to proceed with a research proposal as well as in writing a grant proposal (McGaghie 2009).

Literature searching begins with a well-defined question, including the population of interest, the intervention (and comparison group, when relevant), and relevant outcomes. The search should be relatively comprehensive for the previously mentioned reasons of understanding the potential merits of the proposed study. Thus, search strategies should emphasize sensitivity over specificity. Comprehensive descriptions of how to search the educational literature are available (Haig & Dozier 2003a, b). Greater sensitivity is achieved by using the Boolean operator OR as opposed to AND when combining search terms and by using synonyms of keywords or search terms. Searching should also use more than one database, especially because some educational research articles might be difficult to retrieve from MEDLINE due to inadequate subject headings (Haig & Dozier 2003b). MEDLINE does not include all journals that publish articles on medical education research (Maggio et al. 2011). Education Resources Information Center, for example, is the largest educational research database. Checking the citations in relevant publications on a topic can enhance the process of looking for valuable articles, although such checking is less systematic than searching the literature. Additionally, educational researchers should be sure to pay due attention to studies originating from other countries, because ignoring international studies constitutes a bias and results in a lessened understanding of the field.

At the same time, in the early phases of planning the research, it is not necessary to be exhaustive and thoroughly comprehensive in the search, as would be expected for a systematically conducted review on a topic (Haig & Dozier 2003a). Instead, the goal is to be confident enough that the proposed research will be contributory to the field. To this end, it is also well worth reading the "Introduction" and "Conclusion" sections of similar studies, in order to see how those studies and findings were justified as important.

Choosing a team

Educational research is rarely conducted alone, although this way of proceeding is certainly an option. A team can contribute by providing constructive criticism and mentorship,

providing an independent check of the literature that serves as background for the research, supporting research processes administratively, and participating in particular aspects of the study such as getting the requisite approvals from the Ethics Committee, also known as the Institutional Review Board, in order to proceed, contributing to study design, collecting and interpreting the data, and writing components of the paper. Thus, it is important to think about the skills and expertise that a potential team member might bring, that person's compatibility with other team members, and whether that person has both the requisite enthusiasm and ability to meaningfully contribute. Being certain that there is sufficient methodological expertise, for example, in study design or qualitative or quantitative analysis, is vital to the success of the team. Choosing team members who are enthusiastic, hard working, and capable can also add substantially to the pleasure inherent in the work. The team should also take its time on discussing the value of the research and the prospective paper rather than be in a rush to get started in order to optimize the processes and the final product.

One consideration in creating a team is an expectation that the members will contribute sufficiently to warrant authorship. In general, contributions should be substantial for this purpose. Criteria for authorship include a substantial contribution to the conception and design, acquisition of data or analysis and interpretation of data, drafting the article or revising it critically for important intellectual content, and final approval of the version to be published. The International Committee of Medical Journal Editors requires all three components to be present (International Committee of Medical Journal Editors 2009), although there is debate about the reasonableness of such stringent criteria (Shaw 2011). In our view, authors are publicly accountable for the rigor and professional integrity of the work, and they should have participated in a sufficiently rich manner that the scholarship is strengthened by their work and influence throughout the process. Discussion about the order of authorship may also arise at this early stage of choosing a team, with a general principle being that the person who conceived of the study, and/or the person who does the most work, has the strongest claim to the first authorship. The order of subsequent authorships is determined by the amount of work completed. One convention is that the most senior academic author goes last, although it is not clear how widely this convention is accepted or applied. A very helpful approach is to establish the ground rules and expectations early on for the work ahead.

Under many circumstances, it is especially helpful to identify a statistician in advance of formally beginning a quantitative research project because the design of the study will be shaped by the hypotheses and outcome measures envisioned. Understanding the statistical tests can also be challenging for many researchers. The statistician can help by reviewing the study design and the instruments used to define outcome measures. It is important to rectify identifiable problems in study design before starting and to use valid and reliable outcome measures when these are available. In the absence of valid outcome measures, care should be taken to develop and pilot test a new instrument in accordance with acceptable standards (Sullivan 2011). A statistician's advice can also be sought regarding the practicability of the anticipated analyses for answering the research question(s), which is advice that should at least qualify for an acknowledgment and perhaps co-authorship should the statistician's work be sufficient to fulfill other criteria for authorship. Choosing the right statistical tests and getting the statistics done correctly is an important consideration in the decision by an editor whether or not to publish (Bordage 2001).

Choice of methods

The nature of the educational research question determines the choice of methods to be employed in the planned and disciplined approach to securing its answer and to delineating the parameters of the study (Sackett & Wennberg 1997). As previously indicated, questions should be carefully crafted and focused in order to facilitate the choice of educationally relevant outcome measures. In qualitative research, however, the focus is typically on hypothesis generation as opposed to hypothesis testing. Other than enabling an answer to the research question, the choice of methods should be plausible, address potential confounding variables or biases, validly address subject selection and settings, and allow for unexpected outcomes or events to occur (McGaghie et al. 2001).

Selection of the research design, moreover, should conform to ethical standards that seek to ensure that the overall aim of the work is valuable and that the methods of research are appropriate. These ethical standards seem less salient in education research in which the potential, for example, of true physical risks to volunteers are minimal. Nevertheless, the appropriateness of the question and the adequacy of efforts to limit harm to participants may be important considerations. For these reasons, educational research in the United States is included under the umbrella of federal regulations for human subjects research (Table 2) and, in both American and European settings, must be prospectively approved and overseen by an Institutional Review Board or formally deemed exempt from institutional review (Roberts et al. 2001; Roberts et al. 2005; Hoschl et al. 2012). If a study seeks to clarify whether learners who are women or who are under-represented ethnic/racial minority students perform similarly to male or majority learners, for example, and they do not, the anticipated consequence of negative labeling should be considered by the research team, as well as by the institutional reviewers, and the potential negative impact lessened. To illustrate, in a multicenter study on health care policies and practices of students performed by one of us, there was the possibility that certain medical schools would appear less sophisticated or less compassionate in their policy approaches. The intent of the study was clearly not to expose individual schools but to help raise understanding of how institutional milieu may influence student self-care practices, so the analyses were performed and presented in publications in a manner that allowed for the pattern of compassionate policies and increased appropriate care-seeking to be apparent. Similarly, data regarding women, under-represented minorities, and particularly women who are also under-represented minority students were aggregated across schools to lessen the likelihood that individual students would

Table 2. Definitions and guidelines relevant to educational research involving human subjects (Adapted from www.hhs.gov/ohrp/index.html [Accessed 02 December 2012]).

Research is defined as ''a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge.''

A human subject is defined as ''a living individual about whom an investigator (whether professional or student) conducting research obtains (1) Data through intervention or interaction with the individual, or (2) Identifiable private information.''

Educational research may be formally deemed exempt, but is not required to do so, by an Institutional Review Board if several conditions are met:

(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, and achievement), survey procedures, interview procedures or observation of public behavior, unless:

(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation

(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, and achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if:

(i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter

(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects

(5) Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine:

(i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs

be identifiable. Although the study had extensive confidentiality safeguards in place, the small number of underrepresented minority women students placed them at risk for stigma and potential identification. The design of educational protocols, as well as all planned analyses and publication steps, must take considerations such as these into account in order to fulfill the ethical standards of the field.

Moreover, consideration should be given to how the dependent status of students can constitute a constraint on students' autonomy (Roberts et al. 2005). Subtle coercion is a very important issue in medical education research because the research is mostly conducted by teachers with their subjects as students or trainees. Offering credits for class in exchange for participation in a study may constitute such a form of subtle coercion. The same faculty who evaluate students often conduct research, creating a potential conflict of interest (Roberts et al. 2005), and students' opportunities to complain or to appeal may be limited if they think that negative consequences will accrue if they do so. Safeguards include having an independent person or researcher distributing and collecting questionnaires, foregoing rewards in the form of credits for participation, and protecting anonymity of responses (Table 2).

There are a variety of ways for classifying educational research design (Gall et al. 2003; Fraenkel & Wallen 2006; Horn et al. 2009; Ringsted et al. 2011). The AMEE Guide identified four main categories of design: exploratory, experimental, observational, and translational (Ringsted et al. 2011). Separate publications of the Guide series are devoted to describing more fully each of these methodologies. In brief, exploratory studies include descriptive qualitative studies that are used to identify and explain elements of phenomena and their relationships. Observational studies include cross-sectional or correlational studies such as surveys, cohort studies following volunteers forward in time, and case–control studies looking backward in time from a particular outcome. Experimental studies include randomized and non-randomized controlled trials. Translational studies focus on implementing the findings of educational research to real-life settings. Systematic reviews, which are methods for combining and synthesizing the information from studies on the same or similar educational questions of interest (Reed et al. 2005; Hammick et al. 2010), should also be added to this list of categories of design.

All of these methods can provide valuable information. An important strength of controlled trials is the allowance of an assessment of possible causal outcomes. The most rigorous of experimental methods is the randomized controlled trial, although a randomized controlled trial can be difficult or impractical to achieve in some educational settings, especially when there are ethical barriers to randomizing learners. Given important limitations of randomized controlled trials (Prideaux 2002), it is recognized that the quality of research is as much defined by the integrity and transparency of the research philosophy and methods as by the superiority of one research design over another (Bunniss & Kelly 2010).

Once the method for study is selected and a decision has been made to pursue the work, as noted earlier in this text, the ethical safeguard of institutional review is necessary because educational research is human research. According to federal regulations governing human studies in the United States (Department of Health and Human Services), human research is defined as obtaining "data through intervention or interaction with the individual," or obtaining "identifiable private information" (Hoschl et al. 2012). Even if the project merely involves the review and analysis of existing data, the intent to contribute to scholarship and generalized knowledge creates the obligation to obtain approval, or formal exemption, from

the jurisdictional institutional or educational research review board (Hoschl et al. 2012).

Strategies for writing

Elegant writing is always difficult to attain, and for many authors even terrible writing can be hard to birth. Indeed, there are a variety of types of writing problems, which include distaste for writing, lack of time, lack of confidence, anxiety in writing, perfectionism, and difficulty in starting and finishing (Boice 1990). For each author it is important to assess and reflect on specific barriers to writing and sometimes to seek help in developing strategies to overcome them. Writing is not easy for anyone all of the time, and developing the requisite skills requires effort. Keywords in this process are patience, perseverance, and fun (Coverdale et al. 2005). A great deal of practice and perseverance is required to complete the research and the writing, and having fun in this work promotes patience and perseverance.

Getting started, even with the first paragraph alone, will bring focus to the project and builds momentum to follow through. It is as though writing the first paragraph commits the writer to the task at hand, from which point it becomes very difficult to put it aside. It is a very good idea therefore to start where it is easiest to do so, which is often the "Methods" section or the "Introduction." The Methods follow a relatively set script, to be described in the subsequent section, in simply outlining the research design and what was specifically done in meeting the goals set for the study.

Starting with what one is ready to do and spontaneously and uncritically writing the first paragraphs help writers to become unstuck when a lack of confidence, anxiety, a desire for perfectionism, or an inability to get going impedes writing. Spontaneous writing bypasses internal censors, generates rhythm and voice, and builds confidence and abilities to be spontaneous, playful, and creative (Boice 1990). External impediments include lack of time and potential distracters such as noise in the environment, e-mail to attend to, television in the background, or child-care responsibilities and require setting aside even brief periods of personal time relatively free from those distracters.

Many dedicated authors have rituals to help support their effectiveness in writing. Opening the curtains, making a cup of tea, sitting in a particular spot, having necessary books or resources nearby, turning off one's phone, and other such activities may create a comfort in the routine of entering the writing task. In order to protect against daydreaming and a general lack of productivity, it helps to develop a reward system based on the amount written as opposed to time spent. For example, a break might be taken as a form of reward after a self-prescribed number of words or paragraphs are completed. Daily maintenance of such a fixed-ratio schedule of reinforcement fosters considerable productivity over time. Moreover, the fun of writing arises in part from social engagement with other members of the team, working together and not alone, and using the available mentorship of the team is a strategy that fosters productivity (Table 3).

Table 3. Some strategies for writing.

Get started, even with the first paragraph alone
Start where it is easiest to do so
Follow a relatively set script or structure applicable to the anatomy of the section being written
Spontaneously and uncritically write the first draft
Find time to write, relatively free of distractions
Create a reward system based on the amount written
Use the team to help in overcoming specific barriers to writing
Be patient, persevere, and have fun

Anatomy of the paper

All educational research papers, including each of the sections, follow a certain logic and possess a standardized structure. Knowing the anatomy of an educational research paper is an important strategy for success in writing. This section is oriented toward quantitative research while qualitative research will be more thoroughly addressed in another Guide.

Introduction

The "Introduction" section has three important components. The first is to demonstrate the importance or seriousness of the topic area, as well as the relevance or significance (Pangaro & McGaghie 2001; Coverdale et al. 2005; Ringsted et al. 2011) of that topic to the community of readers that the target journal serves. This is the "hook" or the rationale for the paper: why does the question — and therefore, the empirical report addressing the question — *matter*? The second component is to describe what research has been conducted on the topic area previously, including the strengths and weaknesses of the earlier research. The third is to indicate why the current study was undertaken and how it plans to rectify any weaknesses and contribute to the field.

These components together set the stage for a statement of the specific research goals or hypotheses for the current project. In this last paragraph of the Introduction, it is also sometimes helpful to add an additional summary comment about what the reader might gain from the study. In these ways therefore the Introduction serves to reel the reader into reading further.

It should also be appreciated that some educational research papers will require a theoretical or conceptual framework in the Introduction. In this case the Introduction might be longer than was indicated above. In this way, papers for educational journals differ from those for biomedical journals, when the latter tend to leave theoretical issues to the "Discussion" section.

Methods

The "Methods" is the most important section because it provides a sufficiently detailed description to enable exact replication, facilitate critical appraisal of the study and decision making about whether to incorporate the findings into educational practice, and permit an understanding of the modifications needed in order to improve the validity of

subsequent designs and methods (McGaghie et al. 2001; Coverdale et al. 2006). Authors should justify the appropriateness of the Methods in relation to the specific research question. The Methods should describe the population from which the sample was drawn and the means for selecting the study participants and reasoning supporting their selection, the particulars of the setting and possible contextual effects on the procedures, the specific outcome measure and methods used to generate and collect data, and procedures for analyzing the data. Because medical education practice is so variable across jurisdictions, countries and schools, it might be helpful to include a specific subsection of the Methods describing the context of the study. The Methods should also note that subjects provided informed consent and that Institutional Review Board approval was obtained or that the study was deemed exempt from approval (Table 2).

In quantitative research, randomized trials should describe the methods of randomization and concealment of allocation. In randomized and non-randomized controlled trials, the following information should be provided: the sequence of procedures; group differences at baseline; presence or absence of blinding and methods for blinding; similarities or differences in the treatment of groups; adequacy of follow-up or intention to treat; and the justification, validity, and reliability of the outcome measures, when that information is available. Describing the methods of selection to groups and group differences at baseline will assist readers in their evaluation of the potential for confounding. Any discrepancies or deviances from the researchers' intended methods of implementation of the study that might influence the outcomes should be identified (Gall et al. 2003). The CONSORT statement, for example, serves to improve the quality of reporting of trials, by providing a comprehensive method for organizing and communicating the Methods (Moher et al. 2001). In quantitative scholarship the reader should have sufficient understanding to evaluate the likely generalizability of the results garnered by the study.

In qualitative research, such as focus group interviews or ethnographic research, as in quantitative research, authors should identify the steps that were taken to reduce possible biases in the collection and interpretation of data (Inui & Frankel 1991; Giacomini & Cook 2000a, b). In particular, reasoning should be justified regarding how the participants were selected and how those participants might enable an understanding of a range of perspectives or social phenomena. Similarly, the instructions given to participants and precise methods for collecting and analyzing the data and the reliability of those methods should be provided. In qualitative scholarship, the reader should have adequate appreciation for the approach of the work in that the data gathering and analyses conform to the expectations of the field. It is understood in qualitative work (Giacomini & Cook 2000a, b) that the process of inquiry and the approach of the investigators may influence in discernible ways the results that are obtained. For these reasons, a rigorous qualitative study may be conducted, yet it may not be possible to assess the generalizability of the results, particularly in small studies.

In quantitative studies, the data analysis procedures should be identified and discussed in the light of the study question and the methods and measures used to answer the question. Because small sample sizes are common in educational research, a calculation of the power (Gall et al. 2003) of a study helps to determine the probability of finding an effect of a certain size, if such an effect truly exists. It should also be appreciated that when multiple outcome measures are used, the possibility of finding a significant difference when none truly exists increases. In this case, the level of significance might be adjusted to reduce this possibility (McGaghie & Crandall 2001). Qualitative studies require more description and that will be covered in other AMEE Guides.

Results

The "Results" section of a research paper should concisely portray the key findings. To be effective, the study findings should be clearly presented and ordered in relation to the research questions (Regehr 2001). The order of the narrative presentation should be clear and coherent; in other words, the Results should not be a mere "laundry list" of data and various statistical comparisons. In approaching the development of the Results, one helpful method is to order the findings in parallel with how the goals were identified in the Introduction and the findings discussed in the "Discussion" section (Regehr 2001). It is only necessary to publish the results that are of high quality and that relate most directly to the specific goals; it is not necessary to publish extraneous data (Louie et al. 2006). Tables or Figures can help provide the requisite detail and complex data or highlight key findings. The headings should be concise and summarize the contents of the Tables or Figures precisely, and the legends should inform the readers about any abbreviations that were used. At the same time, journals' printed space requirements often limit the use of Tables, and data from Tables should not be repeated in their entirety in the text. When Tables are used, the general strategy is to provide the requisite details of the data within them so that the text of the Results can emphasize the key findings without replicating all of the details.

Discussion

The "Discussion" section focuses on the main outcomes of the study first, establishing their context. In quantitative research, which this Guide is primarily about, these findings should be clearly stated and understood in relation to the rationale for the study and previously published findings of interest, possible alternative explanations (Crandall & McGaghie 2001), and implications for readers in their roles as educators, educational researchers, or administrators. One of the key goals of the Discussion is to link the aims and findings with relevant prior research. In this way, the Discussion links back to the Introduction to inform the reader about how these new findings are placed into an appropriate context, including the practical implications of the new findings in relation to prior work as well as any implications for future research. Conclusions must be clearly supported by the data. The findings also should be discussed in relation to the strengths and limitations of the data (e.g. a one-site study, small number of subjects, low response rate, and other contextual factors can

limit the generalizability of the findings), which is usually the work of the penultimate paragraph of the "Discussion" section. It might also be noted that statistically significant differences are not necessarily educationally meaningful. The final paragraph of the Discussion briefly reiterates the main findings and their implications for readers.

Fitting the sections together

The research question, methods, results, and discussion should all include the same elements. This is to say that the Methods should not include something that is not formulated as a research question and the Results should not include new information that is not described in the research question or Methods. The Discussion in turn should not include more or new information that is not part of the Methods, such as an additional description of the context of the study or of the intervention or of the circumstances of the control. Moreover, the Conclusions should follow precisely from the findings and not serve as an extension of the discussion or of the authors' own thinking.

Abstract and title

The writing of the Abstract is usually left until last because the Abstract summarizes the final version of the main body of the paper. It should provide information that is sufficiently complete, within required word limits, in order to accurately convey the main elements of each of the sections of the paper. Abstracts may be structured or narrative, dependent on the requirements of the target journal. The Title should be representative of the study, incite interest, and include keywords that are readily identifiable by search strategies. Because the Title and Abstract set a first impression for editors, reviewers, and readers, it is especially important to write these well. Researchers should therefore not scrimp on the time they dedicate to writing these sections, especially when tired at this last stage of manuscript preparation. After all, readers might only read the Abstract, and the Abstract can also be the basis for a decision as to whether to include a study in a systematic review.

Optimizing the writing

Most papers require a number of revisions and very careful attention to the editing before they are ready for submission (Table 4). For example, the Abstract should be checked to see that the requisite detail in it precisely matches what is contained in the paper. Similarly, information in the Tables should exactly match what was written in the text. The references should be individually checked for their accuracy and concordance with the target journal's requirements for citations. Definitions or terms should be strictly chosen and authors should stick to these rather than change the phrasing at different points in the text. The writing should be concise in using as few words as possible. In addition, citations in the text should be individually checked for the validity of comments ascribed to them. That is also to say that review article texts or abstracts should not be taken at face, and original sources should always be checked.

Table 4. The close-to-submitted version.

Revise and correct until the writing is optimized
Be sure that the findings are discussed in relation to the strengths and weaknesses of the methods for answering the specific research question
Check that the information in the tables and abstract exactly match what was said in the text
Check the validity of comments related to each of the cited references
Check to see that the references are accurate
Keep the style and requirements of the intended journal in mind
Have an experienced reviewer critically read it through
Re-read again with fresh eyes

Consideration ought to be given to the prior published reasons for potential acceptance or rejection of a manuscript during this process of revision and review. Top reasons for success include a clearly and succinctly written manuscript, practical and useful implications, and a discussion that adequately takes account of methodological limitations (Bordage 2001). Top reasons for rejection include incomplete or insufficiently described statistics, over-interpretation or under-interpretation of results, inaccurate or inconsistent data, and defective Tables or Figures (Bordage 2001). It is surprising how often one final read can reveal additional, even minor, issues for attention. Many capable authors suggest that one should permit a manuscript to sit for a week after it is "done" – a careful read-through with fresh eyes allows one to pick up on phrasing and subtleties that help produce the best possible empirical report. Authors who are writing in a different language for an international readership should have someone with expertise in that language read the paper through or seek help earlier to ensure that the editing and language are acceptable. There is also a difference between the English of the United States and the United Kingdom, and most text programs provide the opportunity for tailoring the writing accordingly. It might also help then to have an experienced reviewer critically read a close-to-final version before submission to catch any problems. Such assiduousness in preparation of the final manuscript, coupled with patience and perseverance in the revision processes, promotes the integrity of writing and editorial acceptance of the manuscript. It also protects against a negative bias by journal reviewers.

Choosing the journal

In effect, the choice of journal is a decision considered throughout all stages of writing and preparation of the manuscript. In turn, the choice of journal will have an important impact on the structure of the article and so the authors should read some articles from the preferred journal in order to see what the paper should look like. There are several, sometimes competing, factors in the choice of journal. These include the "goodness of fit" of a paper for the journal and the relevance of findings for the journal's readership, the prestige of the journal (usually judged by its Impact Factor, as discussed in the subsequent text), word limits of educational

research articles, and if known, acceptance or rejection rates, anticipated time to an editorial decision, and time between acceptance and publication. Although there are relatively few education research journals (e.g. Medical Teacher, Academic Medicine, Academic Psychiatry, Medical Education, Teaching and Learning in Education, Advances in Health Sciences Education, BMC Medical Education, International Journal of Medical Education, Journal of Graduate Medical Education, Journal of Continuing Education in Health Professions, and Journal of the International Association of Medical Science Educators), some specialty and general medical journals seek to publish education research. It is important to choose a journal that is interested in the context of the research. For example, some United Kingdom and United States journals may be less interested in research conducted outside of their jurisdictions. Knowledge of the range of options and the proclivity of specific journals for publishing on a topic of interest is helpful.

The Impact Factor, which is published annually by the Institute of Scientific Information in its Journal Citation Reports, is defined as the number of cites to articles in a particular (current) year divided by the number of substantive articles published over the two preceding years (Garfield 2006). Thus, an impact factor of 1 suggests that an "average article" published in two preceding years is cited on average once in a more recent year. Aiming high leaves open the possibility of acceptance in a relatively prestigious journal, but more likely invites rejection. It is often difficult to predict how reviewers and journals will respond, and at the cost of rejection and loss of time and hurt feelings, the reviews received at a relatively prestigious journal should enable the writing of an improved paper and enhanced success at the next journal. Authors should especially take care to reference all relevant articles from the journal to which they are submitting because the editors will likely know of relevant articles omitted from their own journal, and such omissions may lead to concerns about the adequacy of the authors' methods of searching. In addition, these citations might contribute to the journal's impact factor.

One strategy, underutilized in our experience as editors, is to contact the journal in advance of submission to ascertain its interest in a particular idea. Calling or e-mailing the editorial office for advice creates interest and perhaps generates a sense of responsibility and commitment by the editors to have the author become successful. Editors usually appreciate being consulted and given an opportunity to help authors.

Responding to editors and reviewers

Few papers become accepted without being revised. An invitation to revise and resubmit is a very good result because it is uncommon for such manuscripts to subsequently become rejected. When editors signal that they will be willing to entertain a revision – without specifically inviting the revision – the possibility of future rejection is higher, but this opportunity is still positive for the author and should be pursued.

Comprehensive and constructive reviews are a gift (Roberts et al. 2004) and warrant the utmost respect in turn. Reviewers who take time to develop a comprehensive set of suggestions enhance the quality of the final written product, as well as assist the editors in forming a decision concerning publication, ensure scientific rigor, and foster advancement of the field (Roberts et al. 2004). Moreover, reviewers truly try to help and some are experts in the topic of study. To this end, authors should respond positively, non-defensively, and in detail to every reviewer's comment in turn (Table 5). The authors should make the job easy for reviewers and editors by saying what precisely was changed in the text as opposed to just indicating that the text was revised while also avoiding long explanations.

Table 5. Responding to reviewers as consultants and colleagues.

Anticipate that reviewers will provide many suggestions for improvement
Respond positively, with thanks, and non-defensively to every comment in turn
Provide thoughtful, well-argued, and reasoned responses to important or major recommendations
Balance conflicting recommendations
Make changes in line with the reviewers' suggestions at every opportunity

On occasion, an author may not agree with a comment by a reviewer. Reviewers can also make mistakes, and some of their recommendations (such as to obtain a larger sample size) may not be achievable. Frequently, reviewers also will proffer contradictory advice to an author. A thoughtful, well-argued, and reasoned response should facilitate a favorable decision by the editors in this context of expert disagreement. Moreover, being courteous and thankful can count as to whether a journal will accept a manuscript (Guyatt & Brian Haynes 2006) and is a professional responsibility. The guiding principle here is to approach the reviewer as a consultant (Provenzale 2010) or colleague (Roberts et al. 2004) rather than as an adversary. It is important to remember that reviewers do not make publication decisions; editors do. Editors will weigh the insights of the reviewers alongside their own views, plus issues that extend beyond the specific manuscript. For example, the editor may know – although the author and reviewers may not – that an entire set of already-accepted papers on a similar topic are "in the queue" for publication in the very near future. The editors, thus, may attribute more or less weight to the newly submitted manuscript in accordance with how it fits into this set of papers. In sum, the author's primary relationship should be with the editor or editors who are making the difficult decision about whether the piece should be published and how it may be improved. Moreover, the author should understand the nuances of correspondence with editors and the kinds of factors that editors must consider, both intrinsic and extrinsic to the submitted manuscript.

Conclusions

Writing for success is a disciplined and systematic process following prescribed steps. We have emphasized how, though hard work, writing should be wonderfully rewarding and fun.

It is a pinnacle of academic success to see one's research in print and available for others to read and appreciate. Our own starting point was that we wanted readers to get started and to succeed in their quest to become productive educational researchers. The strategies that we have presented here should facilitate success in the academic processes of writing for publication and promote educational research.

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